Low cost carriers, economies of flows and regional externalities

Williams, Allan; Balaz, Vladimir

LOW COST CARRIERS, ECONOMIES OF FLOWS AND REGIONAL EXTERNALITIES

Journal:	*Regional Studies*
Manuscript ID:	CRES-2006-0194.R2
Manuscript Type:	Main Section
JEL codes:	J60 - General < J6 - Mobility, Unemployment, and Vacancies < J - Labor and Demographic Economics, K20 - General < K2 - Regulation and Business Law < K - Law and Economics, L93 - Air Transportation < L9 - Industry Studies: Transportation and Utilities < L - Industrial Organization, N74 - Europe: 1913– < N7 - Transport, International, Domestic Trade, Energy, Other Services < N - Economic History
Keywords:	Air travel, Regulation, Externalities, Migration, Knowledge, Tourism

Low Cost Carriers, Economies of Flows and Regional Externalities

Allan M Williams* and Vladimir Baláž**

* Institute for the Study of European Transformations, and Working Lives Research Institute, London Metropolitan University, 160-220 Holloway Road, London N7 8DB, UK

** Institute of Forecasting, Sancova 56, Bratislava, Slovakia

First received: August 2006
Accepted: August 2007

ABSTRACT

The emergence of low cost carriers, following air travel reregulation in Europe, has major implications for individual firms and regional economies. Understanding regions as 'economies of flows', this paper explores, largely conceptually, how uneven, fluctuating and fragmentary changes in air travel and connectivity, resulting from the activities of low cost carriers, have had substantial impacts on flows of labour migrants, knowledge, business connectivity/investment, and mobile markets, especially tourism. The resulting modifications to institutions and regional externalities contribute to net changes in the transaction costs of individual firms, regional competitiveness, and the unfolding and increasingly interconnected map of uneven regional development in Europe.

Key Words: Air travel, Regulation, Externalities, Migration, Knowledge, Tourism

Transporteurs à faibles coûts, économies de flux et externalités régionales

Allan M Williams et Vladimir Baláž

RESUME

L'émergence des transporteurs à faibles coûts, après la rerégulation des voyages par avion en Europe, a des implications majeures sur les entreprises et les économies régionales. Assimilant les régions à des « économies de flux », les auteurs explorent, largement sur le plan des concepts, comment les changements irréguliers, fluctuants et fragmentaires qui affectent les transports aériens et les connexions, résultant des activités des transporteurs à faibles coûts, ont eu des conséquences substantielles sur les flux de travailleurs migrants, la connaissance, la connectivité/investissement dans les affaires et les marchés fluctuants, en particulier le tourisme. Les modifications qui en résultent pour les institutions et les externalités régionales contribuent aux changements en matière de coût des transactions des entreprises, de compétitivité régionale ainsi que de déploiement d'une carte de plus en plus interconnectée du développement régional irrégulier en Europe.

Mots-clés : Transport aérien, réglementation, externalités, migration, connaissance, tourisme

JEL : J60, K20, L93, N74

Billigfluggesellschaften, Ökonomien von Strömen und regionale Externalitäten

Allan M Williams and Vladimir Baláž

ABSTRACT

Das Entstehen der Billigfluggesellschaften nach der Neuregulierung des Flugverkehrs in Europa hat sich auf einzelne Firmen und regionale Wirtschaften nachhaltig ausgewirkt. Ausgehend von einer Auffassung der Regionen als 'Ökonomien von Strömen' wird in diesem Beitrag auf größtenteils konzeptueller Ebene untersucht, wie sich die ungleichmäßigen, fluktuierenden und fragmentären Veränderungen im Flugverkehr und in den Flugverbindungen aufgrund der Tätigkeiten der Billigfluggesellschaften erheblich auf die Ströme von Arbeitsmigranten, Wissen, Geschäftsverbindungen bzw. -investitionen und mobile Märkte (insbesondere Fremdenverkehr) ausgewirkt haben. Die sich daraus ergebenden Änderungen an den Institutionen und regionalen Externalitäten tragen zu Nettoveränderungen hinsichtlich der Transaktionskosten der einzelnen Firmen, der regionalen Wettbewerbsfähigkeit sowie der entstehenden und zunehmend zusammenhängenden Karte der ungleichmäßigen Regionalentwicklung in Europa bei.

Key Words:
Flugverkehr
Regulierung
Externalitäten
Migration
Wissen
Fremdenverkehr

JEL: J60, K20, L93, N74

Compañías aéreas de bajo coste, economías de flujos y efectos externos regionales

Allan M Williams and Vladimir Baláž

ABSTRACT

La aparición de compañías aéreas de bajo coste tras la nueva regulación de los viajes en avión en Europa tiene repercusiones importantes para las empresas individuales y las economías regionales. Basándonos en una comprensión de las regiones como 'economías de flujos', en este artículo analizamos, en gran medida de un modo conceptual, cómo han repercutido significativamente los cambios desiguales, fluctuantes y fragmentarios de los viajes por avión y la conectividad debido a las actividades de las compañías aéreas de bajo coste, en los flujos de los inmigrantes laborales, conocimientos, conectividad/inversión comercial y los mercados móviles, especialmente el turismo. Las modificaciones resultantes para las instituciones y los efectos externos regionales contribuyen a los cambios netos en los costes de transacción de empresas individuales, la competitividad regional y la creación de un mapa cada vez más interconectado del desarrollo regional en Europa.

Key Words:
Viaje en avión
Regulación
Efectos externos
Migración
Conocimiento
Turismo

JEL: J60, K20, L93, N74

INTRODUCTION

A number of measures to liberalize – or, more precisely, to re-regulate – the supply of air travel in Europe since the 1980s have sought to increase competition, with the intention of realising lower prices and welfare gains for air travellers. These aims have been achieved, notably through the spectacular growth of new market entrants, the low cost carriers (LCCs), although there have also been significant innovations in legacy air carriers such as BA and Air France. By 2004, the LCCs accounted for 19% of all intra Western European air travel (DOBRUSZKES, 2005, p39). The outcome has been not only substantial increases in the volume and frequency of air travel but also new geographies of connectivity and accessibility. This paper explores, largely at the conceptual level but also drawing on fragmentary empirical evidence, the implications for uneven regional development in Europe.

The supply of air travel is increasingly recognized as a factor in regional economic development strategies. This is evident, for example, in the focus on airport development in the strategies of UK regional development agencies, notably the Route Development Fund of the Scottish Development Agency (CIVIL AVIATION AUTHORITIES, 2005, p xiv, 97). And, more specifically, BARBOT (2006, p198) emphasises that regional authorities, faced with excess capacity/high unemployment, and willing to subsidise air transport, make 'perfect partners' for LCCs seeking state subsidies to reduce operating costs. Ryanair have pursued this public-private partnership approach with particular enthusiasm, culminating in the landmark European Commission ruling that some subsidies at Charleroi airport were anti-competitive (BARBOT, 2006; FRANCIS *et al*, 2006, p88).

The causality between air transport services (whether by legacy carriers or LCCs) and regional economic development is blurred (GRAHAM, 2003). Does the supply of air services simply follow demand, or does the provision of such services shape and enhance regional

economic development? Without doubt there is an association, expressed by Docherty (2004, p341) as: 'The most successful regions have class-leading transport and ICT infrastructure to move goods, services, information and people securely, quickly and efficiently'. Moreover, he emphasises the *leading* role of air transport in some circumstances: 'Particularly for knowledge intensive industries, the presence of direct international air links to key global centres of innovation is regarded as critical' (DOCHERTY, 2002, p341). This paper focuses on the role of LCCs in shaping the regional economic performance as a whole, and not only knowledge-intensive sectors.

Although there is increasing recognition of links between air transport innovations and regional performance and competitiveness, the relationships largely remain a conceptual 'black box'. Air travel is itself a 'chaotic concept' (SAYER, 1992) in regional economic analysis, given it is constituted of multiple flows (of tourists, business travellers, workers and tacit knowledge transfers) which are often blurred and multi-purpose (BIEGER AND WITTMER, 2006, p 45). The notion of 'economies of flows' provides a starting point for conceptualising these impacts; as HUDSON (2004, p 462) contends '… economic process must be conceptualized in terms of a complex circuitry with a multiplicity of linkages and feedback loops rather than just 'simple' circuits or, even worse, linear flows'. The paper focuses not so much on predicting regional outcomes – which are necessarily time and place specific - as on understanding changes in economic relationships resultant from the emergence and expansion of LCCs. The reshaping of flows results in institutional changes, shifts in regional externalities, and changes in firms' transaction costs. However, the outcome in terms of regional performance and competitiveness will depend on the *net* inflows of labour, capital, knowledge and mobile markets, and the extent to which LCC flows substitute for, or are additional, to existing flows via other means of transport. The paper addresses three main research questions:

a) What are the consequences of LCC expansion, following re-regulation of the supply of air travel, for inter-regional flows of mobile markets, investment, labour and knowledge?

b) How do these shifts in economic flows mediate regional externalities and transaction costs?

c) What are the general implications for understanding uneven regional development in Europe?

THE PAPER IS DEVELOPED THROUGH FOUR SECTIONS THAT CONSIDER A BROAD CONCEPTUAL FRAMEWORK, BRIEFLY REVIEW EUROPEAN AIR TRAVEL RE-REGULATION, EXAMINE THE ECONOMY OF FLOWS, AND EXPLORE THE IMPLICATIONS FOR UNEVEN REGIONAL DEVELOPMENT. WE USE THE TERM RE-REGULATION, RATHER THAN DE-REGULATION, TO SIGNIFY THAT THE PROCESS INVOLVES MORE THAN LIBERALIZATION OR PRIVATIONS; INSTEAD, IT ALSO INVOLVES THE FRAMING OF A DIFFERENT (EVEN IF MOSTLY, LIGHTER) REGULATORY FRAMEWORK. THE TERM HAS BEEN USED BY A NUMBER OF WRITERS (SEE MAJONE, 1990; EBERLEIN, 1998) BUT LESS SO IN CONTEXT OF THE SUPPLY OF AIR TRAVEL (BUT SEE O'REILLY AND STONE SWEET, 1998).

CONCEPTUAL FRAMEWORK

This section focuses on three issues: regulation, economies of flows, and regional externalities.

Regulation and local economies

Regulation is an important determinant of national economic performance differences (ESRC, 2004; HELM, 2001) but air travel supply, one element in the broader regulatory framework, has received scant attention in research on regional economies (see

DOCHERTY, 2004). In part, this is because of difficulties in disentangling the relationships between airline re-regulation and regional performance.

a) Regulation is multi-level and, echoing AMIN's (2002) comments about scales, these are 'folded in' on each other . The impacts of re-regulation on production at one level are mediated by regulatory changes, or lack of changes, at other levels. For example, EU directives on air travel supply liberalization, leading to the growth of LCCs, tend to be folded into national level regulations, whilst their impact may be significantly mediated if local land use planning constrains the expansion of air services. This is a source of spatiality and temporality in the unfolding consequences of re-regulation.
b) Re-regulation is constrained or effected through interlocking spheres of activities, which make its impacts highly contingent on parallel re-regulatory measures. Thus the impacts of the re-regulation of rights of carriage are mediated by the need for parallel re-regulation in other spheres, such as baggage handling, or ticketing.
c) Re-regulation is shaped by apparently unconnected, or generic, arenas of regulation: for example, by generalized environmental protection or employment laws and, ironically, as argued later, the economic impacts are also mediated by general competitions regulations.

The folding together of different regulatory levels mean that 'geography matters' (MASSEY, 1984). Re-regulation does not occur in a vacuum but is place and time specific. For example, LCCs had a different and far more radical impact on the geography of air travel connectivity in the 2000s than in the 1990s (GRAHAM, 1998; FRANCIS *et al,* 2006). LCCs have also had earlier and more geographically widespread impacts on regional economies in, say, the UK and Ireland than France and Germany (UKCAA, 2004). The impacts are also determined by the structures and flows which differentiate regional economies, as DOBRUSZKES (2005) demonstrates, comparing Tours and Charleroi.

Regional 'economies of flows'

This paper is influenced by MASSEY's (1994, p154) view that places are constituted of local and more spatially stretched relationships, being 'articulated moments in networks of social relations and understandings'. In other words, while places are understood as constituted of flows, social and economic relationships are – at least temporarily – locked into particular places (ALLEN *et al*, 1998). Similarly, regional economies can be understood as economies of flows (HUDSON, 2004, p463): '…for the economy to be performable, fluid sociospatial relations and flows require a degree of permanence, of fixity of form and identity – whether in terms of the boundaries of the firm, of national states or of local places'.

Flows, and how they are 'fixed' or articulated in regional economies, are in constant flux, due to a number of incremental and disruptive innovations, which reshape regional institutions. One such disruptive innovation is air travel supply re-regulation – and more specifically the growth of LCCs - which influences factor mobility and key institutions such as labour and product markets (see the parallel arguments about transport infrastructure, JOHANSSON AND KARLSSON, 1994). While probably not the major driver of changing flows of production factors in most regional economies, LCCs can impact significantly on particular places and at particular times.

In terms of regional development, the most significant flows are:

a) Trade: particularly where customers are mobile, as in tourism, but also just-in-time deliveries (although many LCCs do not carry cargo, in order to speed aircraft turnaround).
b) Labour migration: the volume of flows, and their changing composition (growing emphasis on circulation and temporary migration), are shaped by changes in the availability, frequency and costs of air travel.

c) Capital: the links between LCCs and capital flows in the regional economy are complex. However, LCCs can shape urbanization economies, business connectivity, and perceptions of regional economies, thereby influencing inward investment.

d) Knowledge: depending on the relative importance of tacit versus codified knowledge (POLANYI, 1966), and the role of face-to-face contacts in knowledge transfers (BUNNELL and COE, 2001), LCCs can influence knowledge transactions across regional boundaries.

The key concept for understanding the impact of LCCs on these flows, for the individual firm, is transaction costs (WILLIAMSON, 1981). These are the full costs incurred by firms in making economic exchanges, including for example search and information costs or bargaining costs. Moreover, the '… critical dimensions for describing transaction costs are (1) uncertainty (2), the frequency with which transactions recur, (3) the degree to which durable transaction-specific investments are required to realize least cost supply' (WILLIAMSON, 1981, p 555). LCC services can reduce transaction costs associated with each of these dimension. Consequently, barriers to extra-regional factor flows may be reduced, mediating the economy of flows. Paraphrasing MASSEY (1994), LCCs have potential to shape 'local and distanciated relationships' in respect of each of these flows. Transaction costs are 'flow-specific', so the impact on flows is necessarily uneven. For example, leisure travellers have high price elasticities of demand, and are sensitive to price changes, while business travellers value their time more and are more responsive to costs related to changes in flight frequency and locational convenience (DRESNER, 2006). The regional impacts are complex, not only because individual travellers may have mixed motivations, but also because the *net* changes in flows are critical.

Regional externalities

Shifting the focus of the discussion from the firm to the region, we start with the elusive concept of regional competitiveness (KITSON *et al,* 2004, p991). While recognizing the seminal contribution of PORTER'S (1992) work, we concur with KITSON *et al's* (2004, p994) view that CAMAGNI (2002) provides a more useful perspective: a region may have an absolute competitive advantage when it possesses ' superior technological social, infrastructural or institutional assets that are external but which benefit individual firms'. Such 'regional externalities' influence the efficiency and dynamism of individual firms, and may be positive or negative.

Externalities are generally understood as being effects generated *within* regional boundaries. For example, ALMEIDA and KOGUT (1999, p915) argue, in relation to networks and labour mobility in the engineering industry, that ' … externalities are the outcomes of action of skilled labour in spatially defined markets'. However, in the economy of flows the competitiveness of firms is the outcome of their locally and more distanciated relationships. Hence, regional externalities need to be understood as incorporating air services (provided by LCCs in this instance) on regional economic institutions, such as labour markets, and knowledge communities. Potentially, this has significant impacts on the efficiency and dynamism of firms, and the competitiveness of regions. Of course, in practice not all firms adjust successfully to the threats and opportunities inherent in the reconstitution of the economy of flows, and the impacts are in any case sectorally specific.

The idealised consequences for regional institutions and externalities are displayed in Figure 1. The growth of LCCs changes the prices and frequency of air services, and regional connectivity. These influence key elements in the regional 'economy of flows'. The net changes in flows involve both additionality and substitution effects, in relation to existing flows via other forms of transport (whether by legacy carriers and charters, or by high speed rail or road) . These impact on key institutions in the regional economy. Flows of labour

migrants impact on labour markets, flows of mobile consumers (tourists etc) impact on markets , and flows of knowledge and inter-regional business travel impact on the business environment, influencing investment flows and knowledge transactions. These reshape regional externalities, and hence the transaction costs and performance of individual firms. Moreover, reductions in fares increase real household incomes, a proportion of which may be spent on further travel (as opposed to expenditure on other products/services or being saved). Finally, there are public expenditure impacts: increased expenditure on airports, roads, reducing resulting congestion costs etc are counterbalanced by increased tax yields in a more productive regional economy. Given that externalities are not produced optimally by firms, in this case LCCs, states may be attracted to correct what are seen as market failures for the regional economies, via public subsidies. This, of course, may have deadweight implications, that is subsidising service provision that may have occurred anyway.

Given the difficulties of disentangling the causality between supply and demand – for example, do labour market flows follow or lead changes in labour markets - these are shown as two-way relationships in Figure 1. The productivity and output gains in individual firms may also feedback on LCCs in two ways. Either through increases in average regional productivity levels, and firm incomes, leading to higher demand for LCC services, or in LCCs being able to capture some of the gains in increased regional income (and related tax gains) through negotiating (increased) subsidies from regional governments.

All these changes are, of course, contingent on the nature of existing flows, the structures of regional economies and whether LCCs operate in monopolistic or contested markets (DOBRUSZKES, 2005). These contingencies are discussed further, later in the paper.

AIR TRAVEL SUPPLY RE-REGULATION

Air transport in the EU was re-regulated in three stages between 1987 and 1997, with a new system of European regulation replacing national regulations and bi-lateral agreements (O'REILLY and STONE SWEET, 1998). The third package of measures, in July 1992, was the most radical: as of April 1997, all EU carriers had open access to virtually all routes within the EU (freedom of cabotage). The liberalisation measures intended to ensure that 'air fares should normally be determined freely by market forces' (Council Regulation 2409/92). Further liberalisation initiatives targeted the scarcity and cost of infrastructure, a major determinant of the high costs of European air travel. From January 1999, the ground handling market was re-regulated for third parties at Community airports (Directive 96/67), reducing operating costs. The fragmentation of air traffic management systems was addressed through the 'Open European Sky' regulations (Regulation 549-552/2004). And non-discriminatory and transparent use of computerised reservations systems was introduced by Council Regulation 2299/89. PAPATHEODOROU (2002, p384) summarized the competition logic behind re-regulation: 'the presumption of competition working in thick markets and the significance of contestability …. on thin routes. Under deregulation a multitude of new entrants in popular markets would induce carriers to actively compete'. State aid was also tightly prescribed, a measure which would gain prominence later in the Charleroi case.

The intended competition outcomes were not always realised, not least because legacy carriers initially benefited more than the LCCs. First, competition was often reduced at hub airports (FRENKEN *et al*, 2004, p233), as existing carriers used the new freedoms to increase their dominance over these. Secondly, routes with limited traffic may only support a single (monopoly) carrier (PAPATHEODOROU, 2002). Even where more than one carrier operates at an airport, they may not compete on the same routes, although competition also depends on *all* alternative services, whether at neighbouring airports, or by train. Thirdly, the benefits were realised initially largely by hub airports that increased their connectivity (O'CONNELL, 2006, p60-62; Graham 1998: 90), hardly creating a new economic landscape.

The CIVIL AVIATION AUTHORITY (2005, p2) summarised why the impact of re-regulation was initially limited in the UK (as elsewhere in Europe):

> First, there was the usual time lag between the removal of regulatory restrictions and the exploitation of new opportunities by airlines. New entrants or expanding airlines needed time to build their fleets and to respond to the success of the first movers. Second, liberalization affected the denser London markets sooner than thinner regional markets. Finally, it took time for consumers to change their existing patterns of behaviour .

Competition strengthened in the early 2000s (FRENKEN *at al,* 2004), not least because of new entrants, the LCCs. The impacts on competition were, of course, variable, probably being greater for leisure travellers (choosing between different tourism destinations), than for business travellers or those visiting friends and families at particular destinations. However, in general, there were welfare gains for large numbers of individual travellers, associated with higher frequencies (on existing or new routes), new point-to-point connections, and cheaper fares. By 2004 some 60 new entrant and charter/regional airlines had applied low fares models in Europe (EUROPEAN LOW FARES AIRLINES ASSOCIATION, 2004). Unlike the legacy carriers, LCCs did not establish hubs, but bases, and did not offer connecting flights. Instead, they mainly provided point to point flights, often between previously unconnected or poorly connected regions, although they also provided services to major and secondary airports in the leading economic regions. In some cases, LCCs crowded out existing legacy carriers, so that connectivity to domestic hubs actually decreased (GRAHAM, 2003). However, they also provided cross-border links to international hubs: for example, FlyBe connects Bournemouth to Amsterdam, Paris and Frankfurt. Hence, re-regulation did eventually create a new geography of air travel supply and demand, as LCCs transformed

the connectivity of many non-metropolitan regions, initially in a few countries, but increasingly across Europe.

In summary, re-regulation has reshaped air travel supply and demand within Europe, via increased competition for the legacy carriers, and the growth of the LCCs, which accounted for more than half the increase in passenger seats, 1995-2004 (DOBRUSZKES, 2006, p262). Although they pursued different models, LCCs shared key features (DOBRUSZKES, 2006):

- Economies of density (maximizing flying time, and numbers of seats, for each airplane), which are more important than economies of scale. Turnaround can be as short as 25 minutes, partly due to using smaller, uncongested airports.
- Intensification of the labour process, combing long hours, flexible working practices, and relatively low wages. This was particularly important given high fixed costs (DOBRUSZKES, 2005).
- High seat occupancy rates, related to pricing strategies.
- Additional optimization and cost reduction measures including: standardised fleets of cost efficient aircraft; standardization of services; bypassing travel agents via direct internet and call centre sales (accounting for more than 95% of the sales of Ryanair and Easyjet); and revenues from reservation centres (charging for premium rate services).

Although their precise business models vary, LCCs mostly focus on minimising service delivery costs (CIVIL AVIATION AUTHORITY, 2005, p62), especially relating to labour. In reality, it is difficult to isolate the exact sources of cost and price reductions, not least because there were also favourable concurrent macro-economic shifts (GOETZ and GRAHAM, 2004): but it has been estimated that a 15 percent decrease in prices per

passenger kilometre after re-regulation in Australia could be ascribed to higher load and density factors. LCCs also reduced costs by operating point-to-point schedules between regional airports (BARBOT, 2006): the availability of take off slots allowed schedules to maximise fleet use; there were reduced congestion costs; and in the absence of infrastructure, they could influence the design of new facilities for baggage handling etc. The use of secondary airports in metropolitan regions offered similar benefits to LCCs, although being dependent on customer trade-offs between prices and time utility. An overview of costs on intra-European roots suggests that full service carriers operate at about 9 - 12 € cents per seat-km while LCCs have costs of about 4 - 7 € cents. The main cost differentials stem from seat density, minimizing station and handling costs, using cheaper airports, offering no (free) in-flight catering, and eliminating agents commissions.

LCCs AND THE ECONOMY OF FLOWS

Although promoting regional economic development was not an original aim of re-regulation, this was recognized subsequently. Notably, the EU's COMMITTEE OF THE REGIONS (2004) observed that:

> "[t]he availability of regional air services, and in particular low-cost air services, operating from regional airports improves access to the global economy. This, coupled with the lower labour costs and facilities costs associated with the more remote regions, can encourage the business community to locate new economic investment within the region. Existing businesses in the region could develop their market share by being able to reach other parts of the Member State, the EU and the rest of the world"

This is, of course, an uncritical view of air services, which contribute to both inflows and outflows (ie *net* flows are the key issue), whether of tourists, migrants or investors.

The Committee also concluded that regional economic impacts should be considered under four headings: direct, indirect, induced and catalytic. The first three relate mainly to the air travel industry, while catalytic impacts implyto changes in other sectors, inward investment and tourism (see also YORK AVIATION, 2003). Relatively few studies have quantified these catalytic impacts in employment or income terms (but see OXFORD ECONOMIC FORECASTING, 2003 and YORK AVIATION, 2003). Most estimates are produced by lobby groups, providing few methodological details. For example, YORK AVIATION (2003) reviewed studies of employment impacts at 25 European airports, and found that, on average, 2,100 jobs indirect jobs were generated by every 1000 direct jobs. . Even though such estimates are problematic, not least because many studies confuse marginal and average relationships between direct and indirect jobs, or between numbers of passengers and employment, they indicate the substantial regional economic impacts of re-regulation. In another study, HAKFOORT *et al* (2004) estimated the employment income multiplier for Amsterdam airport. While recognizing the importance of forward linkages (creating an attractive business environment), these were particularly difficult to quantify: 'There is no doubt that expansion of airport activity has an impact on the numbers of firms locating in the area, the number of visitors to conferences, the number of tourists and so on, but in many cases it is hard to find a causal relationship…' (p601). Against this background, the paper examines how LCC growth, has impacted on regional externalities and institutions via four main flows.

Labour markets

The availability, cost, skills and flexibility of regional labour markets are mediated by migration. The question is whether migration is significantly influenced by LCC services. There has, of course, been a long history of labour migration in Europe (mainly south-to-north, 1950s-1970s, but increasingly complex thereafter), which pre-dates air travel re-regulation. However, the nature of labour migration has changed in recent decades (KING, 2002), including shifts from longer-term to more temporary migration, sequential migration, and cycles of migration. There has also been an increase in long-distance commuting, involving regular return trips home, whether weekly or at longer intervals. Arguably, LCCs can impact on labour migration in several ways, but mainly through reducing travel costs and increasing accessibility. Effectively, they reduce the costs of international labour migration and, all else being equal, rebalance the costs and returns of migration (SJASTAAD, 1962), leading to increased mobility. This is most likely under particular conditions:

a) where costs are a significant barrier to individual air travel;
b) the frequency and convenience of air travel connections are an obstacle to air travel; and,
c) the availability of cheaper, more frequent or more accessible air travel connections makes new forms of mobility (based on more frequent return visits) possible for individuals who otherwise would have been unable or unwilling to migrate.

There are no reliable estimates of the extent to which LCCs have contributed to changes in the scale and nature of labour migration and mobility. However, the CIVIL AVIATION AUTHORITY (2005, p68) argues for causal links:

> Low-fare services from a local airport seem to be changing consumers' perceptions about flying generally and consequently are having an effect on travel patterns. As

well as second homes, these services may encourage people to apply for jobs abroad, or may facilitate working far from home'.

It is not so much that travel costs have been reduced (there were usually previous cheaper alternatives available, such as buses). Instead, LCCs have changed time-space relationships, facilitating changes in the form of migration, allowing relatively cheap accessibility and frequent return visits. This has increased the numbers of potential migrants, by encompassing those who previously had been deterred by earlier time-space barriers to travel.

The impacts on regional economies are even more difficult to assess, even a priori, let alone empirically. The economic outcomes depend on: a) the impacts on labour costs, b) the filling of particular (skills) or generalised labour markets shortages, and c) raising or lowering aggregate skill levels in destination economies. There is considerable research on these issues, relating to human capital theories, mainly at the national level (for example, DUSTMANN *et al,* 2003a; DUSTMANN *et al,* 2003b). However, there is little explicit evidence on regional economic impacts, labour markets and externalities. In part this is because skills transfers via migration is not only a matter of changes in aggregate levels of human capital, but also about the social recognition of skills, and whether migrants have sufficient encultured and embedded knowledge to maximise their embodied and embrained knowledge (WILLIAMS, 2006). But it is reasonable to argue that LCC-induced migration is more likely to have a significant impact on labour markets and firm performance in regional economies with substantial skills gaps (PORTER AND KETELS, 2003). The scale of that impact will depend on whether particular types of labour migrants, in terms of skills, were deterred by the higher transaction costs of migration prior to the introduction of LCCs – which is also little researched. In the USA, the evidence suggests that wage impacts are modest, being greatest at the bottom and top ends of the skills range, while labour migration brings

generalised welfare benefits, either via the impacts of skilled workers on the productivity of others workers, or in filling jobs that are shunned by indigenous workers (PERI, 2006). However, such impacts are highly regionalised, as well as being specific to national production and regulatory conditions.

The existence of considerable differences in the skills gap between countries and between regions is consistent with our emphasis on the spatiality of the impacts of re-regulation. The importance of temporality is also evident. Most econometric evidence for the UK suggests there is a time lag before workers can maximise the return to their human capital, due to having to learn about local practices and institutions, or acquire language competency (DUSTMANN, 1994). There are likely to be similar time lags before the full consequences for regional economies are realised.

Business travel and tacit knowledge

Drucker's (1993, p38) widely-quoted conclusion that 'knowledge is the only meaningful resource today', is of course a gross overstatement. But networks are fundamental to knowledge transfers, and knowledge transfers are key to the performance of firms and regional economies. However, there are competing theories of knowledge networking, including both localised learning (MASKELL and MALMBEG, 1999) and essentially non-localised networks, for example communities of practice (WENGER, 1998). In reality, most firms probably draw on several overlapping multi-scalar networks.

The question is whether proximity is critical for establishing the trust that is essential for effective knowledge transfers, and how extra-regional mobility relates to this. AMIN (2002, p393-4) argues that physical proximity and localized face-to-face contacts are not essential for trust-based relationships. Instead, intimacy may be achieved, and trust fostered, through

frequent and regular contacts enabled by distanciated networks of communication and travel, and the interweaving of physically proximate and telemediated contacts. In contrast, ALLEN (2000, p28) stresses that human mobility is important to effect localized networking: ' the translation of ideas and practices …. (is) likely to involve people moving to and through local contexts, to which they bring their own blend of tacit and codified knowledges'. BATHELT et al (2004) provide useful guidance on this point, arguing that knowledge is transferred both through local 'buzz' (various forms of face to face interaction), and along 'pipelines' from extra-local sources. There is surprisingly little empirical evidence as to the relative importance of proximity-based versus distanciated knowledge transfers, or the role of airlines in facilitating the latter. However, SMITH and TIMBERLAKE (2001) argue there is still strong demand for face-to-face business relationships, and that air line route networks are important in their facilitation. And DENSTADI (2004) argues that innovations such as videconferencing have little impact on business travel (estimated at 7-9% at most in Norwegian studies). In part, this is because it is used mostly for intra-company contacts, which account for just 4% of all international business travel in Norway.

LCCs potentially have consequences for the frequency of face-to-face contacts, reshaping knowledge-sharing networks and the efficiency of knowledge transfers, that is positive regional externalities. These may be articulated via increased intra- or inter-firm mobility, or attendances at conferences, exhibitions or other 'knowledge events', as a result of lower travel costs, more frequent and new air connections. Whether this is significant depends on assumptions about: a) additionality and substitution effects (in relation to other transport); b) the importance of face-to-face contacts in specific jobs and industries (see below); and c) corporate strategies for disseminating and applying knowledge. Where these assumptions are met, then arguably the growth of LCCs has significant consequences for transaction cost and firm performance.

The reconfiguration of regional externalities has sectorally variable implications. Air travel use is particularly important for knowledge-intensive activities (BUTTON and TAYLOR, 2000; OXFORD ECONOMIC FORECASTING, 2006). Such activities are unevenly distributed – for example, in the USA, 70% of such employment is located in just 50 of the 321 Metropolitan Standard Areas. Given estimates that employees in the 'new economy' are 1.6 times as likely to take flights for business purposes than those in traditional industries, due to greater reliance on personal contacts, changes in travel costs following re-regulation are especially likely to influence such activities. BUTTON and TAYLOR (2000) demonstrate that the expansion of air services stimulated growth in the 'new economy' in the USA, with the critical factors being the range of destinations connected, and service quality. Another example is provided by The Recruitment Zone, a recruitment consultancy with offices in Edinburgh and London, amongst other locations. Before the introduction of LCC services, the firm paid up to £350 for return air tickets to London, but EasyJet offered a similar service for under £100. The reduced costs allowed The Recruitment Zone to move staff around their offices for training, or on weekly placements. This similarly encouraged opening a branch in Bratislava (THE SCOTSMAN, 1.06.05).

The fact that knowledge intensive 'new economy' sectors have greater reliance on air services means that the growth of LCCs has significant regional implications, that we return to later. But we also argue that knowledge transfer is important to innovation and performance in all sectors, both 'new' and 'traditional'.

Inward investment, business connectivity and business travel

The CIVIL AVIATION AUTHORITY (2005, p65) argues that business passengers, as well as leisure travellers, seek lower fares as well as reliability: 'No-frills airlines have created this expectation and have removed the perception that business air travel, or indeed travel on

regional routes, or even scheduled flights generally, has to be expensive.' Consequently, 'the distinction between no-frills and the existing full-service airlines has now become more blurred'. The utilization of LCCs for business travel is evident in comparative data on legacy-carriers and LCCs (CIVIL AVIATION AUTHORITY, 2005, pp65-6). For example, the proportion of business travellers is 39% on BA's Manchester – Amsterdam route, compared to 34% on Easyjet's Liverpool – Amsterdam route; and 44% on BA flights, compared to 39% on Easyjet flights, on the Gatwick to Edinburgh route. Of course, there may be substitution effects, with LCCs partly providing a low cost substitute for flights that would otherwise have involved legacy carriers. But there is also evidence of additionality effects: a passenger survey at Budapest airport found that 8% of outward, and 5% of inward, business passengers would not have travelled in the absence of LCC services (KPMG, 2005). Although a minority, this is a significant additionality effect. MASON's (2001) survey, of short haul business travellers on legacy carriers and LCCs in the UK, provides similarly useful insights, demonstrating that both large and SME companies use both types flexibly. However, SMEs are relatively more likely than larger companies to use LCCs because the latter often have corporate agreements with particular airlines or travel agents. And - providing further evidence that LCCs can create significant regional externalities - MASON found that a small proportion of SME business travellers had never used legacy carrier services for business purposes.

How does air travel supply re-regulation impact on regional economies in this context? Most obviously it reduces business travel costs (and transaction costs), and CARSON WAGONLIT TRAVEL (2003) argue that LCCs had a maximum of about 8% of the European business travel market, bringing 56% cost savings on average to travel between the city pairs they served, resulting in net total saving of 3-5% in corporate travel budgets. This is a relatively small average saving against total transaction costs, but will be more substantial for

particular companies and regions (see also OXFORD ECONOMIC FORECASTING 2006 for similar evidence in relation to investment in airports).

Beyond this, LCCs may attract inward investment in two main ways. First, LCC services may change the image of a regional economy, enhance external awareness of its business environment, and generate inward investment. The CIVIL AVIATION AUTHORITY (2005, p ix) argues this is significant: '… as realization of low cost travel potential increased so the profile of the airlines, airports and regions concerned also increased'.

Secondly, LCCs can influence the search spaces of potential investors (and their search costs) for whom minimum levels of accessibility (in horizontal or vertical linkages) are important locational factors. OXFORD ECONOMIC FORECASTING (2006) report that a quarter of firms surveyed considered that access to air services influenced their location within the UK. Air passenger services were considered more important than either air freight or air express services, and it is the former which LCCs specialise in. They can also mediate the linkages of existing firms. As noted earlier, these effects are sector specific. BUTTON and TAYLOR (2000) found that the availability of direct international services was the third most important factor in the location decisions of firms in Atlanta. Moreover, there had been a sharp increase in inward foreign investment from specific countries after the introduction of non-stop flights to these. They also report that air transportation was the third most important factor in the location decisions of companies surveyed in Europe. Studies of particular firms in Amsterdam and Zurich have also established the importance of air connectivity for their operations. YORK AVIATION (2003) reports a survey of businesses in Hamburg that demonstrates that 80% of manufacturing firms considered that air service connections were important for accessing their key customers. And SkyEurope's Bratislava-Paris link helped to persuade PSA Peugeot Citroen to build a car assembly plant in Trnava (Slovakia). Prague's new air connections were also a key factor in DHL's decision to build an IT centre in the

Czech Republic in 2004 (FINANCIAL TIMES, 9.12.05; http://firstnews.com.ua/en/trans/trans.html?id=136090).

Although both effects are potentially important, neither should be exaggerated. Arguably, reliance on low cost rather than legacy carriers may signal a region's position in the second tier of regional competitiveness. Moreover, LCCs have a calculating and functional approach to new services: if they do not quickly show a positive return, they may be axed, and potential regional investors will know this risk. Hence, the regional externalities they generate are blurred by uncertainties to some extent. And the impacts of LCC services will depend not only on their exact nature (destinations served, frequency and diversity of services etc) but also on the 'receptive capacity' of the regional economy, that is on the ability of firms to take advantage of changing regional externalities. Additionally, the CIVIL AVIATION AUTHORITY (2005, p2) recognized that:

> While an enhanced network of air services from a region would be likely to be conducive to economic growth, it is unlikely *alone* to be an effective tool for driving economic development. It can, however, make a particular city or region more attractive, at the margin, than another as a location for business.

Nevertheless, inward investment has important implications for regional competitiveness in two ways. First, the entry of new firms is instrumental in increasing aggregate productivity levels, and LCCs arguably may increase numbers of new entrant firms in a regional economy. And OXFORD ECONOMETRIC FORECASTING (2006) report that analysis of panel data for European countries demonstrates a positive link between air transport usage and connectivity, and investment levels, although the causality is not clear. Secondly, there is a long-established argument that foreign investment has higher productivity because it

necessarily has knowledge, and other, advantages (HYMER, 1960), which yields an absolute ownership-specific advantage over host country firms.

Mobile consumers and markets

LCCs also change access to markets, either via air freighting goods or transporting mobile markets (notably tourists) to firms. Air freight is more likely to be significant in deliveries of highly perishable goods, or high-value, low-weight goods, and in just-in-time deliveries. The resultant reduction in inventory costs, or the reduced search/bargaining/enforcement cost of serving markets, can significantly reduce transaction costs, contributing to enhanced firm performance. However, because LCCs rely on rapid turnaround of aircraft, they are not significant in transporting goods. Re-regulation may have influenced the costs and availability of specialised air transport services, or legacy carrier services, for this purpose, but LCCs have only a minor role.

Therefore, in many –perhaps most – regional economies, the main trade impacts are associated with mobile markets. These have several forms, including transporting customers to personal service providers in another region or country. For example, LCCs have generated a fly-to-dentist market from Northern to Eastern Europe, in response to total cost differentials (FINANCIAL TIMES, 9.12.05). However, the main role of LCCs is their contribution to increasing tourism flows (both inwards and outwards), through reducing travel costs and increasing accessibility. 'Tourism demand is quite price elastic, and aviation liberalization has brought down fares, thus increasing tourism overall, and often, altering patterns of tourism' (FORSYTH, 2006, p3). The overall regional net effect depends on: a) the balance between tourist inflows and outflows ; and b) additionality and substitution effects.

There are three potential economic consequences, related to changes in regional externalities. First, the overall outcome is a net increase - or decrease – in market size in any one region, which may impact on performance via scale economies, or stimulating new (higher productivity) entrants to the sector. Secondly, changes in the composition of tourism flows and market segmentation may lead to net increases or decreases in tourist spending. Increases in higher spending tourists would – all else being equal - lead to higher sales per employee in existing tourism firms, or to the entry of new (higher productivity) firms to serve expanding markets. Thirdly, LCCs may change the temporal distribution of tourism arrivals (EUROPEAN LOW FARES AIRLINES ASSOCIATION, 2004, p26): their flights are mostly year round compared to the more seasonal services provided by charters, and they also incentivise mid-week travel. As a result, they provide a more secure and more temporally constant flow of tourists and income to tourism establishments, reducing their effective transaction costs. This is critical in an industry where services are highly perishable (tourist bed nights or theme park rides can not be deferred or stocked) (SHAW and WILLIAMS, 2004, pp21-24).

Given these potential impacts on competitiveness, the key issue is the additionality effects of LCCs. The CIVIL AVIATION AUTHORITY 2005, p ix) argues that there is a positive circular relationship between supply and demand: provision of low cost services generates demand, which further stimulates increases in supply. This EUROPEAN LOW FARES AIRLINES ASSOCIATION (2004, p26) similarly argue that LCC services have increased the number of new tourist destinations directly accessible by air, boosting inter-regional tourism, as leisure passengers are generally reluctant to use connecting flights through congested hub airports. The same report quotes research that demonstrates that an estimated 42% of LCC passengers (for whatever trip purpose) are new, of whom almost three quarters would not otherwise have travelled. Although this figure seems rather high, a survey by KPMG (2005) at Budapest airport found that about one quarter of outbound leisure travellers on LCCs would not have travelled otherwise: 21% of those visiting friends and relatives, and 33% of

those on holiday. The comparable figures for inbound leisure travellers on LCCs were 14% and 16%. Finally, BIEGER and WITTMER (2000, p41) argue that LCCs increase overall tourism, via stiumulating particular market segments, such as short-stay city tourism and second home tourism. There are, therefore, substantial additionality effects for destination regions, which – as argued earlier – reduce transaction costs and enhance economic performance. Whether there are corresponding negative effects for other regions is more complex: is the new holiday (using the LCC) in place of a holiday that would have been taken in the home, or another region? And even if not, has the additional expenditure incurred been diverted from alternative consumption or from savings. These complexities underline the spatiality of the economic consequences of LCC growth.

REGIONAL ECONOMIC IMPACTS: OVERVIEW

The causal links between air transport and regional development are complex, shifting and often circular, but we concur with KNOWLES (2006, p 408) that 'Transport innovations enable specialisation of production and the division of labour to occur, widening market areas and enhancing opportunities for trade'. The classic view is that transport innovations contribute to time-space convergence (JANELLE, 1968), implying greater regional convergence, but in reality this is highly uneven and some places may become relatively less accessible. Therefore, the key question is whether LCCs contribute to a spiral of metropolitan advantage with supply tending to follow demand (JOHNSTON, 1973), or whether they realign regional externalities so as to mediate existing patterns of uneven regional development (KNOWLES, 2006).

Table 1 provides a deductive and suggestive overview of the impacts of LCCs on regional externalities, emphasising their temporality, both in relation to time-lags and duration. The impacts are evident in potentially increased flows of labour migrants, tacit knowledge,

business travel, inward investment, and mobile markets (especially tourism). These are outcomes of shifts in regional externalities which follows changes in air services, while also contributing to shaping externalities through their impacts on regional institutions. For example, lower travel costs lead to increased tacit knowledge transfers, adding to regional knowledge and learning capacity, which in turn enhances further inflows of tacit knowledge transfers. We contend that increases in business travel and tourism were realised relatively quickly, while there were longer time lags for labour migration flows, reflecting slower learning and adjustment to changing costs and uncertainty. The duration of impacts is also variable but we contend that the comparative advantages of regions in terms of inward investment could be expected to decline relatively quickly over the medium term, due to competition from other regions and the hypermobility of international capital. In contrast, increases in knowledge, access to mobile markets, and labour are likely to be longer term, being underpinned by new networks. Finally, we have added congestion costs to indicate that not all the outcomes of LCC expansion have positive externalities.

The impacts of LCCs are also spatially variable. Not all regions benefit from LCC services, the services are highly differentiated, and there are several contingencies to note. First, there is additionality: whether LCCs create a new geography of accessibility and connectivity compared to legacy carriers. Table 2, based on DOBRUSZKES (2005), provides empirical evidence on the regional distribution of LCC activity in Europe. To some extent, service provision is demand led, with metropolitan regions accounting for 43% of the total. However, the *relative* impact of LCCs - the proportion of air services provided in each regional type – is strikingly different. Their impact on metropolitan and central regions is relatively modest (11% and 14% respectively) compared to the intermediate, peripheral and especially the sub-central regions (17%, 20% and 47%). They also account for more than half of the growth of air services in the sub-central and intermediate regions. Therefore, they do modify the traditional concentration of air services in metropolitan regions, and potentially bring

disproportionate positive regional externalities to other regions, especially sub-central regions.

Secondly, the reshaping of regional externalities depends on critical threshold levels. There are considerable differences between having a single point to point connection (for example, between a medium sized city and an important tourism destination) and a range of LCC services to multiple destinations. DOBRUSZKES (2005) illustrates this in a comparison of Tours and Charleroi. The former has a single Ryanair connection, providing relatively minimal additional connectivity, and an already substantial tourism market, so overall economic impacts are relatively modest. In contrast, Charleroi is a Ryanair base, with flights to 12 destinations in 2004, offering significant direct connectivity where virtually none had existed previously. Hence, the regional economic impacts are highly differentiated, even within the zones that seemingly have benefited most from realigned regional externalities.

Thirdly, LCCs – although operating different business models – tend to be opportunistic and potentially unreliable providers of air services. While enhanced regional externalities do generate increased air travel supply in the medium term, LCCs often undertake minimal market research and quickly abandon a route if deemed unprofitable. The associated risks for companies which are particularly reliant on specific routes are considerable. Moreover, because the generation of regional externalities is almost entirely incidental to their operations, LCCs under provide these. That is why (sub) state interventions have been prominent, in order to ameliorate market failures in relation to regional welfare: hence, route development costs often accrue in whole or part to regional authorities, but ironically that means LCCs have relatively low sunk costs, adding to the uncertainty surrounding new air services. Moreover, many new air services attract travellers from an extensive hinterland, as in the case of Charleroi (DOBRUSZKES, 2005), which means that it is difficult to localize the benefits resulting from regional subsidies.

Finally – as noted earlier – the impacts are sectorally variable, and knowledge intensive establishments are most likely to benefit, yet these firms are relatively weakly represented in many non metropolitan regions. However, there are also benefits for labour intensive industries (drawing on enhanced labour migration), those serving inbound tourism, and SMEs compared to transnational corporations. But such generalisations need to be tempered by an understanding of the contingent nature of these impacts.

CONCLUSIONS

In 'economies of flows' (HUDSON, 2004), the growth of LCCs has effectively redrawn the map of accessibility and travel costs across Europe, although the outcomes are highly uneven both spatially and temporally. Similarly to other recent transport innovations, such as restructuring of legacy carriers or introduction of high speed train services, these potentially impact on flows of labour migration, mobile markets (especially tourism), business connectivity/investment and knowledge, which modify regional economic institutions. Although there is a dearth of research on the relationship between lower cost air travel and regional competitiveness, the exploratory analysis in this paper has identified several issues for further analysis.

First, re-regulation has increased absolute levels of accessibility in many European regions, even if relative differentials have widened. There is some evidence available from LCCs, and from consultancy reports, on the impact of low cost air travel supply on passenger volumes and different market segments. LCCs are leading contributors to changing travel habits, generating additional travel, rather than merely substituting for flights with legacy carriers. They contribute to a new geography of air travel supply in Europe, distinguished by lower costs, new connections, and new service frequencies. These are mediating the proximate versus distanciated relationships that distinguish economies as spaces of flows, especially in

respect of labour migration/mobility, knowledge transactions, business connectivity, inward investment, and mobile (tourism) markets. The outcome is complex but, generally, metropolitan regions (with hub airports) were the initial winners, while non-metropolitan regions (especially those which became bases for multiple point-to-point connections) were the longer term winners (GRAHAM, 1998; BOWEN, 2002; DOBRUSZKES, 2005). This is contributing to a new geography of air travel connectivity, although the major metropolitan areas still occupy dominant positions in this respect.

Secondly, the criteria which determine airlines' prospective route selection are critical: cost minimisation; availability of efficient but appropriate facilities; geographic, demographic and strategic considerations; and numbers of regional businesses in the early growth phase (RYANAIR, 2005). Those regions deemed 'not prospective' by LCCs may lag in the changing map of accessibility, and this may reinforce existing, or create new forms of, regional inequalities amongst non-metropolitan regions. But precisely because the generation of external economies is not the priority of LCCs (as with private companies, generally), they under-produce these in relation to the optimal functioning (competitiveness) of the wider regional economy. Moreover, the lack of sunk costs in many routes, reduces their commitments to these, increasing the uncertainty costs for users. Regional authorities seek to rectify such market failures, but are constrained both by limited budgets, and by the EU's competition regulations which made these regional externalities possible in the first place.

Thirdly, there is persistent non-contestability on some routes, where travel costs remain relatively high. However, a single carrier providing a link may be preferable to no link, whilst the proximity of neighbouring airports, offering similar services, may also reduce non-contestability. However, PAPATHEODOROU (2002, p387) argues for new forms of re-regulation to counter non-contestability, and ensure economic gains are realised: 'to avoid

the side effects of the previous system, price regulation should explicitly provide productivity incentives'.

Fourthly, while evidence on the realignment of economic flows is limited, even less is known about their regional economic impacts. While there have been estimates of the aggregate effects on employment, spending or investment, there have not been – to the best of our knowledge – any attempts to analyse systematically the outcomes in terms of regional externalities and institutions. Therefore, this paper has been limited to discussing key issues relating to regional externalities in relation to disaggregated flows. Assuming additionality effects in each case, or at least reductions in the transaction costs of existing flows, critical issues have been highlighted relating to the volumes and levels of labour skills, tacit knowledge transactions, inward investment and foreign ownership, and the balance between inbound and outbound tourism. The overall impacts depend on the resulting net flows.

Finally, the paper has not sought to identify or predict the impacts on specific regions. Flows are locked into particular places (ALLEN *et al*, 1998) so that their impacts are determined by, for example, existing economic structures and institutions and the potential to realise dynamic gains through micro changes in individual companies – not to mention broader social and cultural relationships. These complex changes in externalities and institutions, and the interfolding of different levels of regulation, require substantial empirical research which, given the paucity of secondary statistics, presents substantial challenges for primary data collection. Ideally, such research should be longitudinal, focussing on a period of significant change in LCC services and regional economies. Given the growing emphasis on the role of air travel, both supply and demand and airports in regional development strategies, the need for such evidence based policy recommendations is pressing.

Acknowledgement:
This research was funded by the EPSRC as part of a project on 'The Unintended and Indirect Effects of Performance Measurement and Regulation on UK Productivity: A Multidisciplinary Overview', within its programme on 'Closing the Gap'. We are particularly grateful to Jeremy Clegg and Gerben Bakker for their helpful comments .

REFERENCES

ALLEN, J. *et al* (1998) *Rethinking the Region,* Routledge, London.

ALLEN, J. (2000) Power/economic knowledges: Symbolic and spatial formations, in J. BRYSON, P. W. DANIELS, N. HENRY and J. POLLARD (eds.), *Knowledge, Space, Economy,* Routledge, London

ALMEIDA, P and KOGUT, B. (1999) Localization of knowledge and the mobility of engineers in regional networks, *Management Science,* **45**, 905-917

AMIN, A. (2002) Spatialities of globalization, *Environment and Planning A* **34,** 385-399

BARBOT, C. (2006) Low-cost airlines, secondary airports, and state aid: An economic assessment of the Ryanair-Charleroi Airport agreement, *Journal of Air Transport Management,* **12**, 197-203.

BATHELT, H., MALMBERG, A. and MASKELL, P. (2004) Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation, *Progress in Human Geography* **28**, 31–56

BIEGER, T. and WITTMER, A. (2006) Air transport and tourism – perspectives and challenges for destinations, airlines and governments, *Journal of Air Transport Management* **12**, 40-46

BOWEN, J. (2002) Network change, deregulation and access in the global airline industry, *Economic Geography* **78**, 425-440

BUNNELL, T. G. and COE, N. M. (2001) Spaces and scales of innovation, *Progress in Human Geography* **25**,: 569-589

BUTTON, K. and TAYLOR, S. (2000) International air transportation and economic development, *Journal of Air Transport Management* **6**, 209-222

CAMAGNI, R. (2002) On the concept of territorial competitiveness: sound or misleading?, *Urban Studies* **39**, 2395–2411.

CARSON WAGONLIT TRAVEL (2003) *What benefits to low cost carriers really bring to business travel in Europe?*

CIVIL AVIATION AUTHORITY (2004) *The Effect of Liberalization on Aviation Employment*, CAP 749, Civil Aviation Authority, Economic Regulation Group, London

CIVIL AVIATION AUTHORITY (2005) *UK Regional Air Services,* CAP 749, Civil Aviation Authority, Economic Regulation Group, London

COMMITTEE OF THE REGIONS (2004) *Own-initiative opinion on low-cost airlines and territorial development*, 17 June 2004.

DENSTADLI, J. M. (2004) Impacts of videoconferencing on business travel: the Norwegian experience. *Journal of Air Transport Management* **10,** 371-376.

DOBRUSZKES, F. (2005) Compaignes low cost Européennes et Aéroports secondaires: quelles dependence pour quell développement regional?, *Les Cahiers Scientifiques du Transport,* **47,** 39-59

DOBRUSZKES, F (2006) An analysis of European low-cost airlines and their networks, *Journal of Transport Geography,* **14**, 249-264

DOCHERTY, J. (2004) Transport and regional economic competitiveness in the global economy, *Journal of Transport Geography,* **12**, 341–342

DRESNER, M. (2006) Leisure versus business passengers: Similarities, differences, and implications', *Journal of Air Transport Management,* **12**, 28-32

DRUCKER, P. F. (1993) *Post-socialist society,* London, Butterworth-Heinemann.

DUSTMANN, C. (1994) Speaking fluency, writing fluency and earnings of Migrants, *Journal of Population Economics,* **7**, 133-156.

DUSTMANN, C., FABBRI, F., PRESTON, I., WADSWORTH, J. (2003a) *Labour market performance of immigrants in the UK labour market,* Home Office, Online Report 05/03, London

DUSTMANN, C., FABBRI, F., PRESTON, I. and WADSWORTH, J. (2003b) *The local labour market effects of immigration in the UK*, Home Office, Home Office Online Report 06/03, London

EBERLEIN, B. (1998) Regulating public utilities in Europe: mapping the problem, Florence, Robert Schuman Centre, European University Institute

ESRC (2004) The UK's productivity Gap. ESRC Seminar Series, London.

EUROPEAN COCKPIT ASSOCIATION (2006) *Upheaval in the European Skies*: *Low Cost Carriers in Europe: Economic Data, Market and Pilot Demand Forecast,* second edition, Brussels: European Cockpit Association

EUROPEAN COMMISSION (1999) The European Airline Industry: From Single Market to World-Wide Challenges. A Communication from the European Commission to the Council of Ministers, the European Parliament, the Committee of Regions and the Economic and Social Committee. Com1999/182 final

EUROPEAN LOW FARES AIRLINES ASSOCIATION (2004) *Liberalisation of European Air Transport: The Benefits of Low Fares Airlines to Consumers, Airports, Regions and the Environment*, European Low Fares Airlines Association, Brussels

FORSYTH, P (2006) Martin Kunz Memorial Lecture. Tourism benefits and aviation policy, *Journal of Air Transport Management* **12**, 3-13

FRANCIS, G., HUMPHREYS, I, ISON, S. and AICKEN, M. (2006) Where next for low cost airlines? A spatial and temporal comparative study, *Journal of Transport Geography* **14**, 83-94

FRENKEN, K., VAN TERWISGA, S., VERBURG, T. and BURGHOUWT, G. (2004) Outlook on Europe. Airline Competition at European Airports, *Tijdschrift voor Economische en Sociale Geografie*, **95,** 233–242

GOETZ, R. and GRAHAM, B. (2004) Air transport globalization, liberalization and sustainability: post-2001 policy dynamics in the United States and Europe, *Journal of Transport Geography*, **12,** 265–276

GRAHAM, B. (1998) Liberalization, regional economic development and the geography of demand for air transport in the European Union, *Journal of Transport Geography*, **6,** 87-104,

GRAHAM, B. (2003) Air transport policy: reconciling growth and sustainability, in I. Docherty and J. Shaw (eds.), *A New Deal for Transport,* Blackwell, Oxford

HAKFOORT, J., POOT, T. and RIETVELD, P. (2001) The Regional Economic Impact of an Airport: The Case of Amsterdam Schiphol Airport, *Regional Studies*, **35,** 595–604

HELM, D. (2001) Making Britain more competitive: A critique of regulation and competition policy, *Scottish Journal of Political Economy*, **48**, 471-487.

HUDSON, R. (2004) Conceptualizing economies and their geographies: spaces, flows and circuits, *Progress in Human Geography,* **28**, 447–471

HYMER, S. H. (1960) *The International Operations of National Firms: A Study of Direct Foreign Investment,* MIT Press, Cambridge Mass. (thesis 1960; published 1976)

JANELLE, D. G. (1968) Central place development in a time-space framework. *Professional Geographer* **20**, 5-10

JOHANSSON , B. and KARLSSON, C. (1994) Transportation infrastructure for the Malar region, *Regional Studies* **28,** 169-184

JOHNSTON, R. J. (1975) *The World Trade System. Some Enquiries into its Spatial Structure,* Bell, London

KING, R. (2002) 'Towards a new map of European migration", *International Journal of Population Geography,* **8,** 89-106.

KITSON, M., MARTIN, M. and TYLER, P. (2004) Regional competitiveness: an elusive yet key concept? *Regional Studies,* **38,** 991-999

KNOWLES, R. D. (2006) Transport shaping space: differential collapse in time-space. *Journal of Transport Geography,* **14**, 407-425.

KPMG (2005) Low cost airlines – What's in it for tourism?, KMPG, Budapest

MAJONE, G. (ed.) (1990) *Deregulation or Re-Regulation? Regulatory Reform in Europe andthe United States,* Pinter, London

MASKELL, P. and MALMBERG, A. (1999) Localised learning and industrial competitiveness, *Cambridge Journal of Economics,* **23,** 167-185

MASON, K. (2001) Marketing low-cost airline services to business travellers. *Journal of Air Transport Management,* **7**, 103-109.

MASSEY, D. (1984) *Geography Matters,* Cambridge UP, Cambridge

MASSEY, D. (1994) *Place, Space and Gender,* University of Minnesota Press, Minneapolis

O'CONNELL, J. F. (2006) Corporate rivalry and competition issues in the airline industry, in A. PAPATHEODOROU (ed), *Corporate Rivalry and Market Power: Competition Issues in the Tourism Industry,* I. B. Tauris, London.

OXFORD ECONOMIC FORECASTING (2006) *The Economic Contribution of the Aviation Industry in the UK*. Oxford: Oxford Economic Forecasting.

O'REILLY, D. and STONE SWEET, A (198) The liberalization and reregulation of air transport, *Journal of European Public Policy,* **5**, 447-466

PAPATHEODOROU, A. (2002) Civil aviation regimes and leisure tourism in Europe, *Journal of Air Transport Management,* **8**, 381–388

PERI, G. (2006) Immigrants, skills, and wages: measuring the economic gains from immigration, *Immigration Policy in Focus* **5**, 1-7

POLANYI, M. (1966) *The Tacit Dimension,* Routledge & Kegan Paul, London.

PORTER, M. (1990) *The Competitive Advantage of Nations,* Macmillan, London.

PORTER, M. E. (1992) *Competitive Advantage: Creating and Sustaining Superior Performance.* Issue 10. PA Consulting Group,
London.

PORTER, M. and KETELS, C. H. (2003) *UK Competitiveness: Moving to the Next Stage*, DTI Economics Paper No. 3, London

RYANAIR (2005) Ryanair Investor Day 4 October 2005, presentation by Ryanair, www.ryanair.com

SAYER A. (1992) *Method in Social Science: a Realist Approach,* Routledge, London.

SHAW, G. and WILLIAMS, A. M. (2004) *Tourism and Tourism Spaces,* Sage, London.

SJASTAAD, L.A.(1962) The costs and returns of human migration, *Journal of Political Economy,* **7** 0S, 80-93.

SMITH, D. A. and TIMBERLAKE, M. F. (2001) World city networks and hierarchies, 1977-1997, *American Behavioural Scientist,* **44**, 1656-1678

WENGER, E. (1998) *Communities of Practice: Learning, Meaning, and Identity*,
Cambridge University Press, Cambridge

WILLIAMS, A. M. (2006) Lost in translation: International migration, learning and knowledge, *Progress in Human Geography,* **30**, 588-607

WILLIAMSON, O. E. (1981) The economics of organization: The transaction cost approach, *The American Journal of Sociology,* **87,** 548-577.

YORK AVIATION (2004) *The Social and Economic Impacts of Airports in Europe,* York Aviation for Airports Council International.

Table 1: Generalised impacts of LCCs on regional externalities for individual firms

Impact on flows	Regional externality	Timing of delivery		Duration term	
		Sooner	Later	Medium	Long
+Increases in labour migration	Labour market costs, flexibility and skills supply		X		X
+Increases in tacit knowledge transfer	Knowledge and learning capacity		X		X
+ Increases in business connectivity	Access to markets and suppliers, and inter-regional networking potential	X			X
+ Increases in inward investment	Knowledge capacity, and regional image		X	X	
+ Increases in mobile markets (tourism)	Access to markets	X			X
- Overall increase in travel leads to congestion	Reduced accessibility		X		X

Table 2: Distribution of LCC services by regional economic type: Europe, 2004

	% of all LCC services	% of all regional services	% of recent growth due to LCCs
Metropolitan	43	11	34
Central	15	14	37
Sub-central	17	47	87
Intermediate	9	20	64
Peripheral	16	17	43
Non-localized	1		22
TOTAL	**100**	**15**	**42**

Source: DOBRUSZKES (2005)

Figure 1 Re-regulation, flows, externalities and performance